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REDUCED ISOTOPE DOSE AND RAPID IMAGING SPECT MPI WITH EXCELLENT IMAGE QUALITY

ACC Poster Contributions
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Background: In light of recent focus on ionizing radiation from medical diagnostic imaging, cardiac SPECT imaging needs to become shorter with lower radiation exposure. Recently introduced CZT (Cadmium Zinc Telluride) SPECT cameras have the potential to achieve both goals.

Methods: All patients (pts) undergoing a stress MPI over a 4 month period on a CZT camera with Tc-99m sestamibi were reviewed. Pts were divided into 3 groups based on imaging protocols: low dose stress-only, high dose stress-only, and full dose rest-stress. Pts were matched by gender, stressor (exercise or pharmacologic), and BMI ± 5 kg/m2. Stress image quality was graded on a 4 point scale (poor, adequate, good, and excellent) by 2 blinded readers. If discrepant results, a third reader evaluated image quality and an average was taken. Demographics, tracer dose, stress imaging time, and total counts in the FOV were reviewed.

Results: Of 717 pts imaged, the age was 64.0 ± 12.5 yrs, 50.5% were female, 58.9% underwent exercise stress, 41.1% pharmacological stress, and the BMI was 27.9 ± 5.7 kg/m2. 117 low dose pts were matched to controls in the high and full dose groups. By adding 2 minutes to stress imaging for a total of 5 minutes, an equal number of total counts were acquired in the low dose group despite lower count rates (Table). This produced equivalent image quality in the 3 groups at a 57% lower isotope dose.

Conclusion: New SPECT camera technology significantly reduced radiation exposure while also substantially decreasing image acquisition time.

Characteristic	Low Dose Stress-Only	High Dose Stress-Only	Full Dose Rest-Stress	P Value Low-High	P Value Low-Full
Time (minutes)	4.6 ± 0.7	3.2 ± 0.6	2.9 ± 0.3	<0.0001	<0.0001
Total Counts (kcounts)	57249 ± 12179	56489 ± 11964	57951 ± 11729	0.63	0.65
Counts/Second (kcounts/s)	214.2 ± 58.1	309.0 ± 87.5	338.7 ± 92.9	<0.0001	<0.0001
Image Quality (1-4)	3.5 ± 0.6	3.4 ± 0.6	3.5 ± 0.4	0.61	0.26
Gating Quality	Diagnostic	Diagnostic	Diagnostic	NS	NS
Tc-99m Dose (mCi)	12.5 ± 0.3	29.2 ± 3.5	41.7 ± 3.6	<0.0001	<0.0001